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EXAMINER
THIRUGNANAM, GANDHI

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _24 November 2009_.
2a) ☒ This action is FINAL.　　2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-33_ is/are pending in the application.
　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-14,16,17,21-25,27,28,32 and 33_ is/are rejected.
7) ☒ Claim(s) _15,18-20,26 and 29-31_ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
　　a)☒ All　b)☐ Some * c)☐ None of:
　　　1. ☒ Certified copies of the priority documents have been received.
　　　2. ☐ Certified copies of the priority documents have been received in Application No. _____.
　　　3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
　　　　application from the International Bureau (PCT Rule 17.2(a)).
　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

1.   The response received on 21 November 2009 has been placed in the file and

was considered by the examiner. An action on the merits follows.

Claims 1-33 are pending.

The Examiner withdraws the Objection to Fig. 14 of the Drawings

The Examiner withdraws the Objection to the Specification.

The Examiner withdraws all Objections to the claims.

The Examiner withdraws the 35 USC 101 Rejections of claim 23.

Response to Arguments

2.   Applicant's arguments filed 21 November 2009 have been fully considered but

they are not persuasive.

3.   Applicant argues that Applicant Admitted Prior Art (AAPA) does not teach or

suggest the limitation "image positional relationship detection means for detecting, for each sub-

region having a predetermined size, of the comparison image, a positional relationship between the input

image and the comparison image generated by said comparison image generation means;".

        AAPA *(pg. 2 lines 6-15)* discloses a "posture candidate group determination

means" which determines a "plurality of position/posture estimation value groups" (sub-

regions) by changing six position/posture parameters. The six position/parameters are

the "X-, Y- and Z- directions and angle parameters X-, Y- and Z- axes". These sub-

regions are generated for the "input image data"

        AAPA *(pg. 2 Lines 16- pg. 3 Line 2)* discloses "the comparison image generation

means" generates a "comparison image group" (comparison sub-region images) under

the same illumination conditions as the input image data, using the 3D shape model

data of the target object, a base texture group and "**the position/posture**

corresponding to each position/posture estimation value group" (area defining the

location of the target image sub-regions). This discloses a positional relationship

between the input image and the comparison image.

4.   In particular Applicant argues "AAPA does not detect, for each sub region of the

comparison image, a positional relationship between the input image and the comparison image. The

Office Action attempted to read the recited sub region on the entire "target object" of the AAPA. Amended

claim 1 makes it even more clear that the sub region is a sub region of the comparison image, and is not

the entire target image. For at least the foregoing reason, amended claim 1 is believed patentable over

the AAPA."

  The Examiner disagree's with Applicant's argument that the currently amended

claim language recites a sub-region of the comparison image.

  The amendment to the claim language is unclear and can be read in atleast two

different ways.

  (1) detecting, for each sub-region of the comparison image having a

predetermined size, a positional relationship between the input image and the

comparison image. (each sub-region of the comparison image having a predetermined

size) OR

  (2) detecting for each sub-region having a predetermined size of the comparison

image, a positional relationship between the input image and the comparison image.

(the sub region has the size of the comparison image), which would mean there would

be only one sub-region.

  In the case where the sub-region is a sub region of the comparison image, the

entire "target object" of AAPA still reads on the claim under this interpretation, as the

"target object" is only a sub-region of the entire comparison image. An image of an

object includes the object as well as pixels which represents portions not of the object

(for example empty space).

5.   From reading Applicant's arguments, The Examiner suggests adding a limitation

"image displacement distribution means segments the comparison image generated by

the comparison image generation means into partial images each corresponding to a

sub-region with a predetermined size".

And changing the "image positional relationship detection means" to "image

positional relationship detection means for detecting, for each sub region, a positional

relationship between the input image and the comparison image generated by said

comparison image generation means"

This would appear to properly claim what Applicant is arguing, as it would clarify

that the comparison image is segmented into sub-region<u>s</u> and for each sub-region a

positional relationship is detected.

This would appear to overcome AAPA, as there would be a plurality of sub-

regions of the comparison image, each with a predetermined size, as AAPA discloses a

single sub-region of a predetermined size.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Claim 1 Lines 9-11 recites "image positional relationship detection means for

detecting, for each sub-region having a predetermined size, of the comparison image, a

positional relationship between the input image and the comparison image generated by said comparison image generation means;"

This limitation is unclear. Does Applicant intend (1) detecting for each sub-region of the comparison image having a predetermined size? OR (2) detecting for each sub-region having a predetermined size of the comparison image. (the comparison image is the predetermined size)

Claims **2-11** are rejected as being dependent on a rejected claim.

Claim Rejections - 35 USC § 102

8.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

9.   Claims 1-2, 6, 11-13, 17, 22-24, 28 and 33 are rejected under 35 U.S.C. 102(a) as being anticipated by AAPA (Applicant's Admitted Prior Art), hereafter referred to as AAPA.

Regarding **claim 1** as best understood, AAPA discloses an estimation system for

estimating an object state, characterized by comprising:

image input means for inputting an input image containing an object whose state

is to be estimated, the state being at least one of a position and posture; *(AAPA, pg. 2*

Lines 2-9, "Input Image Data containing image of an object …. As a position/posture

estimation …")

3D shape data storage means for storing 3D shape data of the object; *(AAPA,*

pg. 2 Line 16, "3D shape model data")

comparison image generation means for generating, as a comparison image, an

image containing the object in a predetermined state by using the 3D shape data stored

in said 3D shape data storage means; *(AAPA, pg. 2 Line 20 – pg. 3 Line 2 "the*

comparison image generation means 920 generates illumination variation space data

which represents an image variation caused by a change in illumination condition when

the target object has a position/posture corresponding to each position/posture

estimation value group. The comparison image generation means 920 generates a

comparison image group under the same illumination condition as that for the input

image data 91 on the basis of the illumination variation space data", where the

predetermined state is the first underlined section and comparison image is the

comparison image group.

Note: the "comparison image generation means" generates an image from the

3D model. An image comprises the model object as well as space where the model

object has not been defined as empty space. The object in the image would be the sub-

region.)

image positional relationship detection means for detecting, for each sub-region

having a predetermined size, of the comparison image, a positional relationship

between the input image and the comparison image generated by said comparison

image generation means; *(AAPA, pg. 2 lines 6-15, where the initial target image has*

parameters containing known errors, where the parameters are X, Y, Z-axis directions

and X, Y, and Z-axes angle parameters, and the comparison images are created by

"changing six position/posture parameters (3D parameters … contained by the

position/posture initial value by a predetermined variation" where the position

relationship is based on the predetermined variation. The sub-region is the "target

object" which has the predetermined size as the same as in the 3D shape model data)

correction amount calculation means for calculating a correction amount of the

object state in the comparison image by using the positional relationship detected by

said image positional relationship detection means; and *(AAPA, pg. 3 Lines 3-7, where*

the optimum position/posture estimation value is the correction amount)

state correction means for correcting the object state set in comparison image

generation by said comparison image generation means by using the correction amount

obtained by said correction amount calculation means, thereby calculating a new object

state. *(AAPA, pg. 3 Lines 7-18, "the end determination means replaces the optimum*

position/posture estimation value with the position/posture estimation initial value and

outputs the value …", where the new object state is the new optimum position/posture

estimation value)

       Claims 12 and 23 as best understood are rejected under the same reasoning as

claim 1 above.

       Regarding **claim 2,** AAPA discloses the estimation system for estimating an

object state according to claim 1, further comprising state determination means for

determining on the basis of the correction amount obtained by said correction amount

calculation means whether the object state set by said comparison image generation

means is appropriate, *(AAPA (pg. 3 Lines 3-14))*

       wherein when it is determined that the object state is appropriate, the object state

set by said comparison image generation means is output as an estimation value, and

(AAPA (pg. 3 Lines 3-14))

       when it is determined that the object state is not appropriate, estimation

processing including the comparison image generation processing by said comparison

image generation means, the positional relationship detection processing by said image

positional relationship detection means, and the correction amount calculation

processing by said correction amount calculation means is executed again by setting

the new object state calculated by said state correction means to the predetermined

state. *(AAPA (pg. 3 Lines 3-14), based on if there is "room for improvement of the*

similarity of the comparison" the object is either output or the new optimum

position/posture estimation value replace the initial value (or current position estimation

value))(AAPA (pg. 3 lines 14-17) discloses "repeatedly executes the above-described

processing until the similarity of the comparison image cannot be improved")

   Claims 13 and 24 are rejected under the same reasoning as claim 2 above.

   Regarding **claim 6,** AAPA discloses the estimation system for estimating an

object state according to claim 1, wherein said comparison image generation means

comprises: means for reproducing a luminance value of an object surface, which

changes depending on an illumination condition; and *(AAPA, pg. 2 lines 16-25,*

"illumination variation space data")

   means for generating the comparison image under an illumination condition close

to that for the input image by using the reproduced luminance value. *(AAPA, pg. 2 line*

25- pg. 3 line 2, "comparison image group under the same illumination condition …")

   Claims 17 and 28 are rejected under the same reasoning as claim 6 above.

   Regarding **Claim 11,** AAPA discloses the estimation system for estimating an

object state according to claim 1, further comprising

   feature extraction means for extracting an image feature amount of each of the

input image and comparison image on the basis of luminance values of the input image

and the comparison image generated by said comparison image generation means,

wherein said image positional relationship detection means detects the positional

relationship between the input image and the comparison image for each sub-region on

the basis of the image feature amount extracted by said feature extraction means.

(AAPA, pg. 2 lines 2-15, where the image data contains luminance values, the target

object is the feature that is extracted from the target image and the comparison image

means, and the shape model data is compared to the feature amounts (object) (pg. 2

lines 16-25)

Claims 22 and 33 are rejected under the same reasoning as claim 11 above.

Claim Rejections - 35 USC § 103

10.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

11.   Claims 3, 14 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable

over AAPA in view of Burtnyk (Patent 5,471,541), hereafter referred to as Burtnyk.

Regarding **claim 3,** AAPA discloses the estimation system for estimating an

object state according to claim 2, but does not disclose

"wherein said state determination means determines that the object state is

appropriate when the correction amount obtained by said correction amount calculation

means is smaller than a predetermined amount, and determines that the object state is

not appropriate when the correction amount is not smaller than the predetermined

amount." *(AAPA discloses determining whether the object state is appropriate based on*

room for improvement, but does not disclose specifically how it is done, Burtnyk Col. 4

Lines 49-50 discloses the well known method of comparison of a correction amount with

a threshold)

It would have been obvious to one of ordinary skill in the art at the time of

invention to modify AAPA with Burtnyk for the purpose of creating a stop condition in an

iterative process.

Claim 14 and 25 are rejected under the same reasoning as claim 3 above.

12.   Claims 5, 16 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable

over AAPA in view of Yang (Patent 6,580,810), hereafter referred to as Yang.

Regarding **claim 5,** AAPA discloses an estimation system for estimating an

object state according to claim 1, but does not disclose

"wherein said image input means comprises means for inputting a moving image

containing an object, and said image positional relationship detection means uses a

latest frame image of the moving image as the input image." *(Yang, Abstract)*

It would have been obvious to one of ordinary skill in the art at the time of

invention to modify AAPA with Inoue for the purpose of estimating a moving object.

Claims 16 and 27 are rejected under the same reasoning as claim 5 above.

Allowable Subject Matter

13.   Claims 4, 7-10 would be allowable if rewritten to overcome the rejection(s) under

35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the

limitations of the base claim and any intervening claims.

14.   **Claims** 15, 18-20, 26 and 29-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15.   Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to GANDHI THIRUGNANAM whose telephone number is (571)270-3261. The examiner can normally be reached on M-Th, 7:30am to 6pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh M. Mehta can be reached on 571-272-7453. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gandhi Thirugnanam/   /Wenpeng Chen/
Examiner, Art Unit 2624   Primary Examiner, Art Unit 2624